SECTION 2

A Look at North Dakota

This section will give a brief description of common vegetation types and geology in North Dakota. Also included is a description of the Northern Great Plains climatology.

2.1 Natural Vegetation

North Dakota is mostly a prairie state, but it does have a number of vegetation types unique to the Upper Midwest. This section describes the primary vegetative communities found in North Dakota.

2.1.a Grasslands

Native prairie is generally divided into three main categories; tallgrass, mixed-grass, and shortgrass. Each of these prairie communities is comprised of a unique blend of grasses and forbs. North Dakota has all three grassland types though tallgrass prairie exists only in remnants of once vast acreage.

Tallgrass Prairie

Tallgrass prairie can include more than 200 plant species. The most common and dominant of these are big bluestem, switchgrass, indiangrass, and prairie dropseed. Other associated grasses include little bluestem, slender wheatgrass, porcupine grass, mat muhly, fescue sedge, meadow sedge, and the invasive Kentucky bluegrass. Some common forbs include blue-eyed grass, meadow anemone, prairie cinquefoil, wild licorice, prairie blazing star, tall goldenrod, black-eyed susan, white sage, and prairie-fringed orchid. Tallgrass prairie once covered much of the central United States and Canada. It is estimated only 3 percent of it remains unplowed. North Dakota's remaining tallgrass prairie is found almost exclusively in the Red River Valley.

Mixed-grass Prairie

Mixed-grass prairie is a combination of tallgrass species found in eastern North Dakota and shortgrass species found farther west. It is dominated by warm and cool season grasses as well as sedges. Common grass species include prairie junegrass, Western wheatgrass, green needlegrass, needle-and-thread, blue grama, little bluestem, and needleleaf sedge. Other associated grasses include Canada wild-rye, spike oats, mat muhly, spikemoss, plains reedgrass, and buffalo grass. Mixed-grass prairie is also known for a rich variety of forbs such as pasque flower, western wall-flower, prairie smoke, Missouri milkvetch, lead plant, Indian breadroot, purple prairie clover, gaura, harebell, narrowleaf blazing star, ball cactus, purple coneflower, yarrow, and several species of goldenrods. Most of North Dakota is dominated by mixed-grass prairie. The mixed-grass prairie can be further divided into the eastern (including the Drift Prairie and Missouri Coteau regions) and the western (Missouri Slope region).

Shortgrass Prairie

Found mostly in the elevated portions of the Missouri Slope region of North Dakota, this grassland habitat is dominated by warm season species that can survive on little rainfall. Grass species mature at 6 to 12 inches in height and include spikemoss, blue grama, needleleaf sedge, threadleaf sedge, buffalo grass, and needle-and-thread. Forbs include sandlily, white wild onion, death camas, buffalo-bean, purple loco, silverleaf, prickly pear, moss phloz, white beardtongue, and fringed sage.

2.1.b Wetlands

A wetland is an area that is inundated or saturated by surface or groundwater long enough to support vegetation typically adapted for life in saturated soil. Wetlands are classified depending on how long water and vegetation are present. These range from temporary wetlands that typically hold water for only a few weeks, to permanent wetlands that hold water year round. North Dakota has about 2.4 million acres of wetlands remaining from an estimated 5 million that once existed. The highest wetland densities are in

the Missouri Coteau and Drift Prairie, collectively known as the Prairie Potholes region. Wetland classifications vary slightly, but general definitions are as follows:

Temporary
Surface water present for a brief period during early spring following snowmelt and occasionally for several days following heavy rainstorms during the late spring, summer, and fall.

Seasonal
Surface water is present for extended periods in spring and early summer, but usually disappears during late summer and fall.

Semi-permanent
Surface water is present year-round in most years. During dry years, however, water may disappear as early as midsummer.

Permanent
Surface water is present throughout the year in all years.

Permanent Wood-bordered
Deep surface water is present year-round and the wetland periphery is predominantly woodland.

Alkali
Highly saline shallow water and alkali salt flats.

Fens
Surface water is sometimes lacking but bottom soils saturated by alkaline ground-water seepage.

Cropland Ponds
Occur in basins with soils that are frequently cultivated.

2.1.c Forest

Forested habitats are found in only a few locations in North Dakota, and they do not cover large contiguous areas. A majority of the forest habitat is found in riparian zones. The Turtle Mountains and northeastern North Dakota contain some of the largest stands of aspen and bur oak. Small areas of Ponderosa pine and juniper forests occur in the southwest.

Riparian
A riparian zone is the area between a body of water and the adjacent upland, identified by soil characteristics and distinctive vegetation that requires an excess of water. It includes wetlands and those portions of the floodplain that support riparian vegetation. Generally it is comprised of trees and shrubs as well as understory vegetation, including a variety of grasses and forbs. Eastern North Dakota riparian zones are dominated by green ash and elm trees where cottonwoods are prevalent in western zones of the state. Although this habitat type makes up a small area it is an important home to numerous wildlife species and is vital to stream health.

Aspen/Oak Forests
Aspen and oak make up 42 percent of North Dakota's forested lands. Aspen is dominant in these forest stands but bur oak, balsam popular, box elder, green ash and paper birch are also present. Shrubs associated with this forest type are beaked hazel, highbush cranberry, Juneberry, chokecherry and raspberry. These stands are often found in association with lakes, wetlands, and grassy meadows.

Pine/Juniper Forests
This unique habitat takes up only 9,500 acres dispersed through the southern half of North Dakota's badlands. Ponderosa pine is the most common species, but a small stand of limber pine is located in

Slope County. Rocky Mountain Juniper, a low growing shrub, dominates much of the rest of the badlands, occupying about 600,000 acres.

2.2 Geography and Geology

North Dakota sits geographically from longitude 97°W to 104° W and latitude 45° 55'N to 49°N and is the 19th largest state. It is 211 miles north to south and 340 miles east to west and for a total 70,704 square miles. Only 2 percent of that area is covered by water. North Dakota is bordered by Minnesota on the east, Montana on the west, South Dakota to the south, and the Canadian provinces Manitoba and Saskatchewan to the north. The state's highest point is White Butte in the southwestern corner of the state, standing at 3,506 feet above sea level. The lowest point at 750 feet above sea level is in extreme northeastern North Dakota.

2.2.a Geological Regions

Red River Valley
The Red River forms the eastern border of North Dakota. The Red River Valley extends 30 to 40 miles on either side of the river. This flat plain was once the bed of Glacial Lake Agassiz. Most of the region is covered by silt and clay deposits consistent with a lake bottom. Beach ridges scattered throughout the valley mark the former shoreline of the giant lake, at various periods of time. The valley rises 500 feet over a bedrock escarpment to mark the natural boundary of the Red River Valley.

Drift Prairie
The Drift Prairie extends diagonally from northwestern to southeastern North Dakota. The land is glaciated, appearing generally flat with washboard like undulations. Soil and weather conditions promote a transition zone between short and tallgrass prairie species. High concentrations of seasonal and temporary wetlands are interspersed throughout the landscape. Grain farming is the major land use of this region.

Missouri Coteau
The Missouri Coteau extends east from the Missouri River to the western edge of the Drift Prairie. This marks the western edge of the glaciated land in North Dakota. Wetlands are numerous on the eastern edge of the Coteau, decreasing toward the Missouri River. Dominant land use is a mixture of small grain and sunflower farming and livestock ranching.

Missouri Slope
The Missouri Slope's sandstone and shale layers were largely unaffected by glaciers that covered the eastern half of North Dakota. The area has an irregular topography with the occasional butte rising above the landscape. Complex drainage systems cut breaks through the topography. Livestock grazing is the predominant use, with some small grain farming mixed in.

Badlands
North Dakota's badlands are a series of buttes, rock outcrops, washouts, and hard wood draws along the banks of the Little Missouri River. The area is characterized by poor soil, steep slopes, high erosion, and shortgrass prairie.

Turtle Mountains
The Turtle Mountains are located in the extreme north central extent of the Drift Prairie. This land form is known as an erosional outlier and covers nearly 1,000 square miles and rises 800 feet above the surrounding landscape.

Figure 1. Major geographic regions of North Dakota.

2.3 Climate

North Dakota's climate is continental and is characterized by large variances in temperature, both on a seasonal and daily basis. Precipitation ranges from low to moderate, and air flow through the region creates windy conditions.

Air Masses

North Dakota is affected by regular changes in atmospheric air masses. Air masses from the polar region bring cold, dry air to the state. Northern Pacific air masses produce warmer, drier conditions, and tropical masses bring warm, wet weather. The Rocky Mountains frequently block air masses from the southern Pacific Ocean from reaching the state.

Temperature

North Dakota's average annual temperature ranges from 37° F in the northern part of the state to 43° F in the south. January is the coldest month. Temperatures average from 2° F in the north to 17° F in the southwest with an average of fifty days below 0 . July is the warmest month with temperatures averaging 67° F in the north and 73° F in the south. Temperatures over 90 are common. North Dakota's highest temperature was 121° F and the lowest -60° F, were both recorded in 1936.

Precipitation

Annual precipitation ranges from 13 to 20 inches a year. The average increases from west to east, with the southeast receiving the highest average precipitation. Winter precipitation is highest in January. June is the wettest month receiving 3 to 4 inches of rain. Areas such as the Turtle Mountains receive higher rainfalls than the surrounding plains, due to higher elevations.